Crosstalk Between Activated Myofibroblasts and beta Cells in Injured Mouse Pancreas.

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Public Summary:
When injured, the human body tries to recover and regrow the injured tissues. This manuscript explored this tissue repair and regrowth process by focusing on how the injured cells tells the host to respond. Using beta-cell injury as a model, we found that regrowth of beta-cells also signals the growth of cells that provide support for beta-cells. The growth of the supporting cells is important for the repair and regrowth of beta cells.

Scientific Abstract:
OBJECTIVES: In injury conditions, myofibroblasts are induced to lay down matrix proteins and support the repair process. In this study, we investigated the role of myofibroblasts, particularly stellate cells, in the growth and regeneration of pancreatic beta cells.
METHODS: We used both in vitro and in vivo approaches to address whether stellate cells may promote the growth of beta cells.
RESULTS: Our experiments demonstrated that activated stellate cells support the proliferation of beta cells in vitro. In vivo, mesenchymals surrounding the pancreatic islets are activated (induced to proliferate) in the islet regeneration model of Pten null mice. These mesenchymals display markers of pancreatic stellate cells, such as desmin and to a lesser extent, smooth muscle actin alpha. We have shown previously that targeted beta-cell deletion of Pten lead to a significant increase in total islet mass. This phenotype was accompanied by an increase in peri-islet mitotic activity, particularly in islets injured by streptozotocin, a beta cell-specific toxin.
CONCLUSIONS: Together with the in vitro observations, our data, here, suggest that that these mesenchymal cells may support the regeneration of the islets. Identifying how the communication occurs may provide clinically relevant mechanism for inducing beta-cell regeneration.